



Central West Farming Systems

FARMERS ADVANCING RESEARCH

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“Your Questions Answered”

RENEWABLE FUELS - ETHANOL

Increased awareness of the effects of greenhouse gas emissions to the environment and possibly climate change has led to a global push for cleaner energy sources than the fossil fuels traditionally used. “Renewable energy” sources are in high demand. Importantly though, in addition to the environmental benefits of producing energy from renewable resources, production of these products has the potential to boost the Australian agriculture industry, provide employment opportunities and in turn increase the viability of rural communities.

What is ethanol? Ethanol is a liquid fuel, produced principally from natural products (sugar and grain). When blended with petrol, ethanol is an oxygen enhancer and results in a cleaner burning more efficient fuel. Moreover, it is non toxic, water soluble and bio-degradable. It is renewable and therefore presents a sustainable option for use in conjunction with petrol.

Why produce ethanol? Globally, an increasing demand for ethanol is being driven by factors including a need to reduce greenhouse gas emissions, a desire for cleaner fuels and energy security issues. More recently, increased world oil prices have triggered the ethanol debate in Australia and internationally. An ethanol industry in Australia would reduce the reliance on imported oil and fossil fuels. In addition to this, it could boost grain commodity markets for producers and create employment in regional areas where processing plants would be established due to a need to easily access grain for production and market the by-products produced by the process.

The production process, inputs and by-products

Ethanol is essentially alcohol. It is the intoxicating component in alcohol and as such the production process is very similar to that of beer. It can be made from grain, sugar or other vegetable compounds (starch or sugar-based feedstock's). Grains commonly used for ethanol production are corn, wheat, barley and sorghum.

Production from grain involves grinding or milling the raw product to create ‘meal’. This is slurried with water to create ‘mash’. Enzymes are added to convert the starch into dextrose, a simple sugar. Ammonia is also added to control the pH level and acts as a nutrient to the yeast.

The ‘mash’ is then heated in a process called liquefaction prior to fermentation. Wheat and barley, which have similar characteristics and can therefore be co-processed, are heated to a temperature of 85°C for 4 hours. Corn, which must be processed separately, is heated to 105°C for 2 hours.

The product is then cooled to approx 30°C prior to the fermentation which takes between 48-59 hours depending on the product used. The fermented mash known as ‘beer’ is distilled by the addition of steam producing a condensed liquid ethanol product. This is then dehydrated to remove its remaining 5% water component. Finally, the ethanol is de-natured (poisoned)

with the addition of 5% petrol to ensure it is not sold or consumed as a potable alcohol.

There are two main by-products made during ethanol production, distiller's grain and carbon dioxide. The distiller's grain is sold to livestock producers as it is a highly nutritional feed source commonly used in feedlots. The carbon dioxide which is produced in large quantities, can be collected and compressed on-site and sold to other industries for products such as soft drinks.

What is happening here in Australia? A number of factors have hampered the growth of an ethanol industry in Australia including a lack of government action and a sufficient local supply of fossil fuels. Other countries such as Brazil, the worlds largest ethanol producers, have been producing and using ethanol since the 1970's when it was introduced to utilise their large domestic sugarcane supply.

The trend is however changing with increasing world oil prices and a push by consumers for ‘greener’ energy. In 2003 the Federal Government introduced a 10% petrol blend limit but are currently investigating higher percentage blends. Up to 85% blends are currently available in the US for newer model cars.

The ethanol industry now has legislative support from the Federal Government and in 2004 they legislated a tax relief package for fuel ethanol allowing an excise free period until 2011. In addition, the Federal Governments cleaner fuel policy legislates for improved environmental characteristics which may lead to clean fuel additives such as ethanol. Within NSW, the state opposition has recently launched a \$40 million package called “Cleaner Vehicles, Cleaner Fuels”. \$5 million of this would fund the conversion of existing service station infrastructure as part of their Ethanol Action Plan.

Economic analysis indicates that a domestic ethanol industry could create between \$2.5-\$12.5 million profits to Australian grain growers. Some are however hesitant to rush into such an industry, preferring to wait and see what effect the huge growth in the US market will have. There are currently some ethanol production plants in Australia with more possible locations earmarked. Their establishment will depend greatly on world oil prices with a large price spike tipped to be the most likely catalyst.

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Websites

If you are interested in seeking more information on ethanol or renewable fuels you can visit the following websites. If you do not have internet access, please feel free to contact me directly.

www.renewablefuels.com.au

www.daffa.gov.au

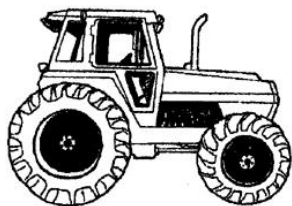
www.grdc.com.au

www.greenhouse.gov.au

www.bioenergyaustralia.org

www.australianethanol.com.au

Information for this fact sheet was sourced from all of the above listed agencies/companies via their websites.



Central West Farming Systems

Machinery Field Day

Friday 23 February 2007

Condoblin Agricultural Research Station, Trundle Rd

Free entry, commercial displays, machinery and precision agriculture demonstrations.

For more information call 6895 1025 or visit www.cwfs.org.au



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